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RLF
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WHITESIDE
BUCKHORN
WEAR
McCAMBRIDGE
WRIGHT
COULTER

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SUBJECT—

TITLE

SPECIAL REPORT BK-20

TESTS OF HYBRID PINES FOR RESISTANCE TO THE PINE REPRODUCTION WEEVIL UNDER FIELD CONDITIONS

Report of Progress
1951 and 1952

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SPECIAL REPORT BK-20

TESTS OF HYBRID PINES FOR RESISTANCE TO THE PINE REPRODUCTION WEEVIL UNDER FIELD CONDITIONS

Report of Progress 1951 and 1952

Introduction

In the spring of 1948, three outplantings were made on the Shasta and Lassen National Forests to test the relative resistance of the Jeffrey-Coulter pine hybrid to attack and injury by the pine reproduction weevil, Cylindrocopturus eatoni Buch., under natural field conditions. One hundred Jeffrey pine parents, one hundred Jeffrey-Coulter hybrids, and 20 Coulter pine parents were used in each of the three tests. One of the plantings was made in a portion of the Big Springs plantation, Lassen National Forest, where the reproduction weevil had practically wiped out the original planting of Jeffrey and ponderosa pine made in 1935. A second planting was made in a portion of the Mount Shasta plantation, Shasta National Forest, where weevil damage had been severe during the 1946 field season. A third planting was made in the McCloud flats area near the Forest Service McCloud Nursery, Shasta National Forest, where weevil damage had been very light[1/].

These plantings have now gone through five growing seasons and during the last two seasons have yielded considerable information on the primary objectives of hybrid resistance to the weevil.

In order to be assured of an adequate population of weevils for these tests, infested material was collected from naturally-infested pine plantings in the Shasta brushfield within a radius of about 100 yards of the experimental planting, and concentrated in this area in the spring of 1951. In 1952, indications were that this would not be necessary because of the natural infestation within the experimental area. In the spring of 1952, the weevil was controlled on about 2000 acres of adjacent plantations through the application of DDT from an airplane. In order to continue the study of hybrid resistance within the experimental area, the trees were covered by paper bags to protect them from the spray.

In the Big Springs area, there was no nearby source of an adequate population of weevils due to the fact that there were no trees remaining from the original planting. For that reason, infested material was collected from the Burney Springs area and placed within the confines of the experimental area. This was done in both 1951 and 1952, and sufficient infested trees were used to simulate about a 15 per cent infestation.

Because of the proximity of the McCloud Nursery, no infested material was placed in the McCloud experimental plot.

1/ Tests of Hybrid Pine for Resistance to the Reproduction Weevil under Field Conditions. R. C. Hall, Forest Insect Laboratory Report. July 15, 1948.

Results

A comprehensive progress report was prepared on this project in 1950[2/] covering the early phases of the work, but 1951 was the first year that any weevil damage had been observed in two out of the three plantings. For this reason, we have only two years of records where weevil damage information is available. Table 1 summarizes the results for these two years' damage. The McCloud Flat planting has not been damaged by weevils to date but damage from other causes has been very severe. These plantings will be discussed below.

1. Mount Shasta

In 1950, 84 Jeffrey pines, 92 hybrids and 13 Coulter pines were still alive. At the end of 1952, 38 or 45.2 per cent of Jeffrey pines had been killed, compared to 6 or 6.5 per cent of the hybrids killed. None of the 13 Coulters had been injured or killed.

2. Big Springs

In 1950, there were 82 Jeffrey pines, 89 hybrids and 6 Coulter pines still living. During 1951 and 1952, 12 or 14.6 per cent of the Jeffrey pines were killed compared to 1 or 1.1 per cent of the hybrids and no Coulter mortality.

3. McCloud Flats

The McCloud Flats planting suffered considerable damage from gophers in 1949 and as a result, there were only 58 Jeffrey pines, 59 hybrids and 5 Coulter pines left in 1950. During 1951 and 1952, there was further damage by gophers and rabbits in which 27 or 46.5 per cent of the Jeffrey pines were killed, 40 or 67.8 per cent of the hybrids and 5 or 100 per cent of the Coulter killed.

Discussion

This experimental planting has demonstrated quite conclusively that the Jeffrey-Coulter hybrid has a very high degree of resistance to attack and injury by the pine reproduction weevil under field planting conditions. Under equal exposure and chance of attack, 3.9 per cent of the hybrids were killed by the weevil during a two-year period compared to 30.1 per cent of the Jeffrey species. Stated in another way, there was only 1 hybrid killed to every 8 Jeffrey pines. This is strong confirmation of Miller's [3/] earlier findings that the Jeffrey-Coulter hybrid was very resistant to weevil injury under caged conditions in the nursery. These studies will be continued for at least three more years, so that we will have a five-year record of weevil resistance.

2/ Tests of Hybrid Pines for Resistance to the Reproduction Weevil Under Field Conditions - Report of Progress. 1948 through 1950.

3/ Resistance of Pine Hybrids to the Pine Reproduction Weevil. J. M. Miller, Forest Research Note No. 68, California Forest and Range Experiment Station. April 1950.

TABLE 1

SURVIVAL RECORDS ON HYBRID PLANTINGS
ON THE SHASTA AND LASSEN NATIONAL FORESTS

Species	Original No. Trees Planted	Living 1950	Trees Killed 1951 and 1952 by Causes					
			Weevil		Rodents		All	
			No.	%	No.	%	No.	%
Mount Shasta								
Jeffrey	100	84	38	45.2	0		38	45.2
Coulter	20	13	0	0	0	0	0	0
J-C Hybrid	100	92	6	6.5	0	0	6	6.5
All	220	189	44	23.3	0	0	44	23.3
Big Springs								
Jeffrey	100	82	12	14.6	0	0		
Coulter	20	6	0	0	0	0		
J-C Hybrid	100	89	1	1.1	0	0		
All	220	177	13	7.3				
McCloud								
Jeffrey	100	58	0	0	27	46.5	27	46.5
Coulter	20	5	0	0	5	100.0	5	100.0
J-C Hybrid	100	59	0	0	40	67.8	40	67.8
All	220	122	0	0	72	59.0	72	59.0